The impact of judgment and framing in entrepreneurs' decision making

By: Amir Emami, Dianne H.B. Welsh, Veland Tamadani, and Ali Davari

Emami, A., Welsh, D.H.B., Ramadani, V., & Davari, A. (2019). The impact of judgment and framing in entrepreneurs' decision making. *Journal of Small Business & Entrepreneurship.* https://doi.org/10.1080/08276331.2018.1551461

This is an Accepted Manuscript of an article published by Taylor & Francis in *Journal of Small Business & Entrepreneurship* on 24 January 2019, available online: http://www.tandfonline.com/10.1080/08276331.2018.1551461

Abstract:

This study investigates entrepreneurs' judgment and decision-making when faced with decision anomalies in the context of mental accounting and the framing effect. Both contexts can pave the way for the evaluation of entrepreneurs' judgment and decisions in terms of anomalous situations and comparison with nonentrepreneurial judgment and decision-making. This study aims to identify the behavior of entrepreneurs in two distinct studies. Study 1 shows that mental accounting bias has little impact on entrepreneurs' judgment. Specifically, the effects of cognitive bias, task framing, endowment, and the integration of information did not affect entrepreneurs' decision-making. However, cognitive biases of sunk cost and extra-cost influenced entrepreneurs' judgments. In Study 2, data on the framing effect comparing inexperienced and experienced entrepreneurs' decisions using an online survey reveal that experienced entrepreneurs' judgments were less affected by the framing effect while inexperienced entrepreneurs were more biased toward loss aversion.

Keywords: Decision anomalies | framing effect | mental accounting | decision-making | uncertainty | cognitive bias | entrepreneurs

Article:

Introduction

The trait approach identifies locus of internal control, risk-taking, need for achievement, tolerance of ambiguity, and over-confidence as characteristics of entrepreneurs. Entrepreneurs use intuition and lean more toward cognitive biases in their decisions than managers (Busenitz and Barney 1997). The trait approach focuses on the extent to which factors influence the judgment and decision-making process in entrepreneurship. Entrepreneurs are faced with risk and uncertainty on a daily basis, so dealing with certain tasks only covers a small portion of their

activities (Abatecola, Caputo, and Cristofaro 2018; Ramadani et al. 2017). Kirzner (1979) introduces the pure entrepreneur, for whom decision-making is one of the most important tasks. Casson (1982) and Palmer (1971) consider entrepreneurs skilled decision-makers. Good judgment is an essential part of the process of finding opportunities under conditions of uncertainty (Foss and Klein 2012).

Mental accounting and the framing effect influence individuals' judgments and decision-making unconsciously (Emami et al. 2011; Kahneman 2003). These anomalies create biases that challenge individuals' thought processes. The main issue in decision anomalies is that decision-making can be a function of sunk and trivial issues related to the decision itself. For example, when decision-making and selection is a function of the frame and form of a question, the presentation can lead to bias in judgment and decision-making, as well as unstable and unadaptable behaviors (Kahneman, Knetsch, and Thaler 1991).

Research exploring entrepreneurs' judgments, decision-making, and decision anomalies often focuses on biases. For example, Burmeister and Schade (2007) examine the status quo bias among entrepreneurs. Studies that emphasize several cognitive biases do not often identify decision-making patterns. Therefore, our study examines entrepreneurs' judgments and decision-making using mental accounting anomalies and the framing effect through a survey research method in two studies. Study 1 compares entrepreneurs' and nonentrepreneurs' judgments using mental accounting. The findings show that the impact of a mental accounting bias on entrepreneurs' decision-making is low. The effects of cognitive bias, including framing task, endowment effect, and the integration and segregation of information, do not influence entrepreneurs' decision-making, though this is not the case for nonentrepreneurs. The results also reveal that entrepreneurs' cognitive biases of sunk cost and extra-cost effects influence their judgments. Cognitive biases in mental accounting by others do not influence entrepreneurial analytical thinking under conditions of uncertainty. To better understand entrepreneurs' judgment processes, Study 2 adds an experience factor and compares the judgment of experienced and inexperienced entrepreneurs with students using risk framing. The results show that experienced entrepreneurs show few tendencies toward framing effects while inexperienced entrepreneurs are more biased toward loss aversion. In addition, experienced entrepreneurs approach the decision problem differently, and their experience and alertness enable them to analyze the framing effects.

The structure of this article is as follows: We begin with a review of the literature on entrepreneurship, mental accounting, and the framing effect. Next, we present the methodology, results, and discussion. We conclude with implications for practice and directions for further research.

Mental accounting and the framing effect

The study of decision-making entails two major approaches: normative and descriptive. The normative approach pertains to rationality and logic. Normative models promote better judgment and decision-making. To this end, there is a need for certain criteria to evaluate and collect data on judgments, identify what makes them better or worse, and test methods for improving them when there is a possibility for improvement (Baron 2006). In terms of behavioral decision-

making, this approach is the more dominant but also has some contradictions. For example, entrepreneurial opportunities that lend themselves to profitable situations are highly indeterminable because of uncertainty. Therefore, not all profitable situations in entrepreneurship can be deemed opportunities, unless the entrepreneur, through a course of purposeful actions, concludes that they are and, in doing so, reduces uncertainty.

The descriptive approach pertains to people's beliefs, purposes, and preferences (priorities) as they are and not as they should be. The real goals and preferences of individuals in their entrepreneurial journey are among the most important concerns of research on entrepreneurial action and value creation (eg Dimov 2018). According to Tversky and Kahneman (1981), prospect theory best explains contradictions in decision-making. A rational individual, as defined in the social sciences and economics, is someone who seeks to maximize his or her utility. For example, if *a* is less than *b* and *b* is less than *c*, he or she will assume that *a* is less than *c* and that *c* has a higher value. At any time and situation, this person will believe in this inequality, which is called the "invariance rule." Entrepreneurs as decision-makers do not always take the most desirable option. This is when decision anomalies come into play—when a person makes unique decisions or takes distinctive actions in a business situation (eg an entrepreneur decides to start a business) that others might question (eg necessity, success probability). One possible factor is entrepreneurs' mental model, which shapes a given business decision (ie a frame that constitutes an entrepreneur's judgments and convinces him or her that this is an opportunity but seems a strange and unexpected step to others).

According to Tversky and Kahneman (1981), judgments and decision-making can be affected by the extent to which decision outcomes undergo manipulation. One of the most notable and much-disputed issues is "framing," which strays from rational decision theory (Tversky and Kahneman 1986). Rational decision-making models are based on the normative model of expected-utility theory (Baron 2008). Thus, decision outcomes need to conform to the principle of description invariance (Kahneman and Tversky 1984). This principle maintains that an individual's choices should not change because of how a decision scenario is manipulated in different conditions or situations. Nevertheless, even contradictory choices could be framed through different manipulations of a decision problem. This is because framing of the problem may objectively highlight part of the information, directing an individual's decision to a choice that may not be rational but based on subjective values.

Tversky and Kahneman (1981) introduced risk framing, which challenges an individual's judgment by way of two sets of risky versus certain options with identical expected values in positive and negative manipulations. This classic framing is the most widely used in research (Levin, Schneider, and Gaeth 1998). According to Tversky and Kahneman (1981), individuals tend to prefer risk-averse alternatives when the outcomes are framed in term of gains (eg saving lives, making money), but shift to preferring risk-taking when the equivalent outcomes are framed in terms of losses (eg dying, losing money). For example, in a risk assessment test, participants were asked to choose between two options; the options were presented by different plans and the maximum income was $3000. In Plan 1, if participants accept option A, they have a 50% possibility of gaining $3000, but there is also a 50% chance of not losing any money. In option B, participants gain $1500 without participating in the test. In Plan 2, if participants accept option A, there is a 50% possibility of losing $3000, but there is also a 50% chance of not

losing any money. In option B, participants will lose $1500 without participating in the test (Soman 2004).

Plan 2 is similar to Plan 1 in its outcome, except that in Plan 1, information is framed in the form of a gain and reaping a profit, while the opposite occurs in Plan 2. In this experiment, the results showed that in Plan A, 35% of participants chose Option A and 65% chose Option B. In Plan B, 72% chose Option A and 28% chose Option B. This discrepancy is deemed irrational because it contradicts the invariance rule. Therefore, in this case the problem designer has been able to create contradictory choices by manipulating the problem. In the decision-making literature in behavioral sciences, this manipulation is referred to as the framing effect, and when these effects are used to manipulate the frame of issues related to financial and economic profits, the effects of mental accounting arise.

Cognitive biases in mental accounting

In prospect theory, loss aversion is an individual's tendency to grant more weight to losses, that is, "the attractiveness derived from the possible gain is not high enough to compensate for the aversion of the possible loss" (Soman 2004, 387). For example, losing $1000 will cause more dissatisfaction and annoyance to an individual than earning $1000. The influence of this cognitive bias on triggering other decision anomalies is significant. We focus on the most important and widely used decision anomalies next.

Task framing

Positive features of an option or multiple options provide good reasons for choosing. Therefore, in their mental models, people are likely to give more weight to a certain option. The negative features of the same option also provide a good reason to reject it. Therefore, they give more weight to that option when rejecting it (Soman 2004). According to this bias, individuals tend to choose an option that has the highest positive value and to reject an option with the most negative information over a moderate option. This principle has implications for anticipating people's ideas and predicting consumer behavior in marketing issues.

Endowment effect

Typically, people have little desire to give up what they already own, even though they gain an advantage in return. In other words, the utility of keeping a default state of mind seems to be greater than the utility of leaving it. As such, the loss of owned things tends to seem greater and more annoying than later profits (Kahneman, Knetsch, and Thaler 1991). The rigidity of sales can help explain the use of the endowment effect in the market. This cognitive bias will reduce the number of sales in the market because it creates a special condition in which people are not willing to easily relinquish what they own (price x) and will not pay the price of x when they are not the owner. This prejudice to the current situation negates buying and selling (Gourville and Soman 2002).

Sunk cost effect

When faced with the issue of financial decision-making, a person may create a mental model called the “mental account.” A mental account will not be resolved until it has the expected value, which is referred to as the "sunk cost" effect. For example, when a person buys a ticket for a football game and the expected value of watching the game is not fulfilled at the stadium, that person will experience mental stress. His or her passion for football encourages him or her to watch the game, not the obligation, even if the weather conditions are not favorable and he or she could be watching the game on television instead. However, the cost that has already been paid (the ticket) and the account created in mind force this person to attend the game. The formulation of this effect, which results from the cost paid before the service is received, is called the “sunk cost effect” (Cheema and Soman 2003). Individuals show commitment to the cost they have already paid and try to avoid wasting it. In many cases, this bias is a waste of resources and opportunities. When bias is at work, people base their decisions on past events rather than focusing realistically on the outcomes (Kahneman, Knetsch, and Thaler 1991).

Extra-cost effect

The effect of an imposed cost or extra cost is the result of an intuitive process in which individuals compare the mental value with the total cost. In this perceptual error, individuals refer to the record of an expense; if it is related to a mental account, which has not yet turned into a profit, the individual will view paying the extra cost as an imposition. However, if the benefit is already gained or does not relate to a previous mental account, this new amount will create a new independent account (Gourville and Soman 2002; Soman 2004).

Influence of information integration and segregation

When the decision information is integrated, the effect of avoiding loss is reduced. For example, Cheema and Soman (2003) presented recreational packages to participants in an integrated and segregated way and asked them to express their opinions on the attractiveness of each one. In the first plan, the price of the services provided in the recreational package was presented as a total (eg a flight ticket, accommodations, and a driver for a total price of $2000). In the other plan, each service was priced separately (eg flight ticket $500, accommodations $1400, and a driver $100, totaling $2000). The authors found that participants rated the first recreational package as more attractive. According to Thaler (1999), people integrate or segregate the (negative or positive) outcomes of a single option. In the integration of outcomes, they combine them before using the value function and consider them part of the same mental account. However, when segregating different outcomes, they use the value function for each of the losses or wins, which makes their decisions irrelevant.

Opportunity cost in mental accounting

Economists and accountants use the term “opportunity cost” to indirectly describe a phenomenon in mental accounting. Opportunity cost is an advantage gained from abandoning an action associated with the default situation (Frederick et al. 2009). For example, assume that an individual is considering buying a vehicle from a dealer offering a low-profit loan. When that individual has enough money for the car (ie the default situation), he or she may withdraw the request for the loan and think "Why should I pay interest when I have enough money?" He or she

must also take into account that the money not spent on a car could be invested elsewhere for a profit. Therefore, if the return on investment is higher than the interest rate on the car loan, the buyer should take out the car loan. In such decision situations, it is better to focus on the difference between options than on the profit or loss associated with the deal so as not to miss the opportunity and pay an extra opportunity cost (Thaler 1999).

Cognitive intuition

Cognitive intuition and bias may help explain entrepreneurial risky behaviors and perceived entrepreneurial risk-taking. In addition to the significance of cognitive intuition, research in the field of decision-making psychology highlights the importance and framing effect of situations on the risky behaviors of entrepreneurs and managers. For example, Burmeister and Schade (2007) compared the effect of the cognitive "status quo bias" on the decisions of entrepreneurs, students, and bank employees. They found that entrepreneurs were affected by this cognitive bias as much as students, but the effect was less than with bank employees. They likened the experience of entrepreneurs to a double-edged sword as justification for the phenomenon. On the one hand, the experience of knowledge and awareness necessitates a less-error-prone decision; it preserves the status quo bias. On the other hand, their findings did not confirm the bias of entrepreneurial decisions to the status quo bias.

Forbes (2005) shows that entrepreneurs use intuition and cognitive bias to deal with or react to specific environmental conditions associated with shaping venture capital. In their research on decision-making between managers and entrepreneurs, Busenitz and Barney (1997) found that the use of intuition by entrepreneurs can lead to acceptable solutions that are effective and efficient. Barbosa and Fayolle (2007) examine how changes in available information in relation to the creation of venture capital affect the perception of entrepreneurial risk associated with the framing effect and ultimately lead to launching a venture. They tested the cognitive bias of availability and anchoring information in entrepreneurs' risk decision-making processes and argued that the anchoring information in hierarchical events, defined as a series of incidental events, can result in entrepreneurs giving excessive weight to business success and, thus, error in the decision-making process. In non-hierarchical events (independent events), entrepreneurs give little weight to the potential failure of a venture, which also threatens the survival of a business. Therefore, cognitive intuition and framing issues are not independent of each other. Framing may lead individuals to have an anchoring information bias, thus influencing their perceptions of entrepreneurial risk.

Emami (2017) examines how different framings of entrepreneurial opportunity can influence the risk preference of entrepreneurs and nonentrepreneurs and whether this differs between men and women at the time of opportunity evaluation. He found that the framing of the situation as positive or negative significantly affected an individual’s judgment of entrepreneurial opportunities. Negative frames have stronger effects, causing more inconsistencies in judgment and leading individuals to choose riskier options. Moreover, Emami concludes that male and female entrepreneurs have more risk dispositions in situations in which there is consistency between the topic of the problem and the individual’s role. For this reason, entrepreneurs show more risk-taking behavior than nonentrepreneurs in their endeavors.

Research on decision-making, environmental uncertainty, and complexity labels decision-making as one of the most important factors leading entrepreneurs to use intuition and avoid formal and logical decision-making models (Busenitz and Barney 1997). In general, entrepreneurs face more uncertainty in decision-making than other groups. Entrepreneurs often make decisions with little or no history, no specific levels of performance, and a low amount of market information (Kreiser and Davis 2010).

Study 1

Sample

The sample population included only male entrepreneurs and nonentrepreneurs of the Tehran province across different industries. We followed Emami's (2017) sampling method to determine our sample of entrepreneurs and nonentrepreneurs. The list of entrepreneurs (approximately 350) came from Tehran's science and technology parks and the Iranian Ministry of Cooperatives, Labor, and Social Welfare of the Tehran Province.[1] Next, we used Nicolaou et al.'s (2009) 5-scale Opportunity Recognition Index to determine the final sample of entrepreneurs. According to experts' recommendations (a group of experts consisted of three entrepreneurship professors and a psychometrician), the minimum required score to be identified as an entrepreneur was 17 out of 25 points. Only 106 male entrepreneurs with scores above this point (>17) were obtained and extracted from the list (ie 350) for the final step; however, of these, only 60 either took part in the survey or had usable questionnaires.

The nonentrepreneurs were those who demonstrated little tendency toward venture activities. This criterion was fulfilled from data collected from staff employees (other than those in managerial positions) of seven large governmental organizations located in Tehran. We compiled a list of randomly selected email contacts of 414 individuals from these organizations. We contacted all of them and asked them to answer the research questionnaire, though only 71 responded to the survey. To ensure proper selection of the nonentrepreneurs, we compared the total scores of entrepreneurs and nonentrepreneurs. The sixty entrepreneurs had a total score of 1140. As the research sample size is based on the number of entrepreneurs (for the better generalization of the results; Emami 2017), we also set the number of nonentrepreneurs to be the same. To this end, we considered the least calculated score in the rankings for the first nonentrepreneur and this went on up to the 60th nonentrepreneur.

Analysis

We adapted the scenarios used in this study from the validated work of Kahneman, Knetsch, and Thaler (1991) and Soman (2004). These scenarios were presented as multiple choices or narrations. The topics used in the questionnaire are a combination of general and entrepreneurial

[1] Tehran, which is the capital city of Iran, is a primary region for emergence and growth of start-ups. Moreover, most established firms distributed throughout the country have their headquarters in Tehran. Traditionally, the government allocates more resources (eg, tax discounts, low rents, access to facilities and training) to this region of the country for entrepreneurial activities. For this reason, knowledge-incentive firms are more often based in Tehran than in other provinces. Therefore, almost all research on entrepreneurship in Iran collects data primarily from Tehran entrepreneurship centers (eg, accelerators, science and technology parks, incubators).

issues (see the Appendix). The dependent variable is judgment and decision-making of entrepreneurs and nonentrepreneurs when confronted with mental accounting issues. We used a one-sample *t*-test, two-samples *t*-test, Mann–Whitney *U* test, Cramer's *V*coefficient, and cross-tabulations in the inferential statistics section to compare the decisions of entrepreneurs and nonentrepreneurs. This study has six research questions as follows: (1) What is the difference between decisions by entrepreneurs and others in terms of task framing? (2) Does the endowment effect lead to different decision-making by entrepreneurs and others? (3) Does the sunk cost effect make a difference in mental accounting between entrepreneurs and others? (4) Does the extra-cost effect make a difference between decisions by entrepreneurs and others? (5) Does the integration and segregation of information make a difference between decisions by entrepreneurs and others? and (6) Do entrepreneurs identify the opportunity cost better than others?

Results

The evaluation tool for this cognitive bias was designed to include two business options. We placed the positive and negative features in Business Option A, while Option B included the moderated version of all the positive and negative features. For the first question, most entrepreneurs (70%) chose Option A. When they were asked which options they rejected, 68% chose Option B. Thus, the respondents were not affected by task framing, because the undesirable features of Option A did not make them choose Option A. The Mann–Whitney test (*U*-test) also shows this difference with 95% level of confidence ($N = 58$, $U = 261$, Sig. < 0.01). Conversely, when nonentrepreneurs were asked which options they preferred, they chose Option A (57%), and when they were asked which options they would have rejected, again they chose A (69%). The Mann–Whitney test also shows this at a 95% level of confidence ($N = 59$, $U = 381.5$, Sig. > 0.05). Therefore, in contrast with nonentrepreneurial decision-making, mental accounting does not influence entrepreneurial decision-making.

For the second question, we assessed the endowment effect with a question related to the sale of a rug. A one-sample *t*-test shows that the entrepreneurs were indifferent to selling or not selling the rug ($N = 56$, $t = 0.564$, $\mu = 4.2$, sig. > 0.05) while nonentrepreneurs were reluctant to sell the rug ($N = 59$, $t = –2.5$, $\mu = 3.23$, Sig. < 0.05). These results based on a two-samples *t*-test show a significant difference (95% confidence level) between the decisions of the entrepreneurs and the nonentrepreneurs ($N = 59$, $f = 0.001$, Sig. < 0.05). Therefore, the endowment effect of the proposed framing question is weak for both entrepreneurs and nonentrepreneurs.

For the third question, we evaluated the bias in the sunk cost effect with two questions. The first question asked about an inefficient product upgrade project, and insistence on the continuation of the project would indicate the bias. The second question involved the selling of shares, in which selling of a friend's share reflected a sunk cost bias. The results of a two-samples *t*-test for the first question reveal a significant difference between the decision of entrepreneurs and nonentrepreneurs, with 95% probability ($N = 59$, $f = 3.8$, Sig. < 0.01). A one-sample *t*-test shows that entrepreneurs were insisting on continuing the project ($N = 57$, $t = 2.5$, $\mu = 4.9$, Sig. < 0.01) while nonentrepreneurs did not insist on continuing it ($N = 59$, $t = 25.1$, $\mu = 3.6$, Sig. > 0.05). These results indicate that although the product upgrade project is an inefficient project, sunk

cost has no effect on nonentrepreneurial decision-making while it affects entrepreneurial decision-making.

For this third question, although we find a difference between the responses of entrepreneurs and nonentrepreneurs ($N = 117$, $U = 951$, $p < 0.05$), the results are unclear. This is because the distribution of responses is scattered and there is a 10% difference between the "no difference" and "friend's share" response (Table 1). Nonentrepreneurs chose “friend’s share” as much as their own share. Therefore, this bias does not affect either group.

Table 1. The effect of sunk cost for the second question.

	Your share (%)	Friend’s share (%)	No difference (%)	Total value (%)
Entrepreneurs	20.7	34.5	44.8	100
Nonentrepreneurs	44.1	50.8	5.1	100

In the fourth question, we measured the extra-cost effect with a question about watching a show in a theater. For the entrepreneurs, a one-sample *t*-test shows a significant difference in means ($N = 30$, $t = 6.38$, $\mu = 6.2$, Sig. < 0.01) versus ($N = 27$, $t = 0.359$, $\mu = 4.1$, Sig. < 0.05). Therefore, depending on how the problem was presented (negative vs. positive), we obtained different means. In addition, a two-samples *t*-test shows the difference ($N = 57$, $F = 4.4$, Sig. < 0.01). The results are the same for nonentrepreneurs. In a one-sample *t*-test ($N = 29$, $t = –2.46$, $\mu = 2.9$, Sig. < 0.05) versus ($N = 30$, $t = 0.836$, $\mu = 4.3$, Sig. < 0.05), and in a two-samples *t*-test ($N = 59$, $F = 0.03$, Sig. < 0.05). Therefore, in the case of two questions having the same outcome, both entrepreneurs and nonentrepreneurs make conflicting decisions which approve the influence of the extra-cost effect on their decisions.

For the fifth question regarding integration and segregation, the option included buying a jacket and a calculator in two distinct ways with the same outcome. In this question, we did not observe the bias among entrepreneurs. In both plans posed by the problem, the entrepreneurs had little desire to buy a calculator, and they were almost as willing to drive to another store to buy the calculator ($N = 30$, $t = 3.27$, $\mu = 2.8$, Sig. < 0.01) as to buy the higher-priced option in the mall ($N = 29$, $t = –3.47$ $\mu = 2.8$, Sig. < 0.01). A two-samples *t*-test shows that there is no difference between the responses of entrepreneurs ($N = 59$, $F = 0.6$, Sig. < 0.05). By contrast, the framing effect on nonentrepreneurs is clear ($N = 30$, $t = 0.63$, $\mu = 4.2$, Sig. < 0.05) versus ($N = 29$, $t = –2.74$, $\mu = 2.8$, Sig. < 0.05). A two-samples *t*-test rejects the mean equality of the response with 95% confidence ($N = 59$, $F = 2.08$, Sig. < 0.05).

The sixth question asked whether the respondents would ignore an opportunity when it was clouded by the framing effect of cost. We tested the effect in the selection of Product A and Product B: the selection of Product B for production would indicate that the opportunity cost clouded the choice. Most of the entrepreneurs chose Product A, so the framing effect did not lead to missed opportunity despite the hidden cost. However, the nonentrepreneurs ignored the opportunity. Sixty-six percent of the entrepreneurs chose Product A, and 71% of nonentrepreneurs chose Product B. The hypothesis test results also reject the equality of responses between entrepreneurs and nonentrepreneurs ($N = 118$, $U = 1091.5$, Sig. < 0.01).

Discussion

We used six questions, each containing one mental accounting anomaly, to compare the judgments and decisions of entrepreneurs and nonentrepreneurs. For the first question, we could not confirm the effect of task framing on decision-making among entrepreneurs, while it was effective among nonentrepreneurs. The lack of a task framing effect in entrepreneurs' decision-making proves their analytical characteristic. This cognitive capability enables entrepreneurs to consider other aspects of issues before making decisions.

In the second question, we confirmed the weakness of the endowment effect on decision-making among entrepreneurs, while the effect was effective for nonentrepreneurs. The weak endowment effect in entrepreneurial decision-making is a desirable characteristic. The literature review indicates a positive relationship between sales clerks' long experience in the market and low effectiveness. This feature helps increase profits for entrepreneurs because they have little bias toward maintaining their product and prefer to ensure their success in the long run by increasing sales and remaining in the market.

We examined the effect of sunk cost in the third question and observed this cognitive bias in the decision-making of entrepreneurs. The effect of sunk cost on mental value is usually undesirable, and it has an adverse effect in entrepreneurship. Bias toward a specific task blocks the means to achieve other options. This is opposite the tendency to innovate that Schumpeter (1934) sets as the centerpiece of his definition of entrepreneurship (see Begley and Boyd 1987; Cheah 1990). While this conclusion does not question Schumpeter definition of an entrepreneur, it may be a caveat for entrepreneurs in accomplishing their business tasks. In particular, they should avoid bias toward a solution and always consider other aspects and possible solutions even when implementing their ideas and strategies.

We confirmed the extra-cost effect for both entrepreneurs and nonentrepreneurs in the fourth question. Answers to this question indicated that when entrepreneurs intend to do something, they persist to a greater degree than nonentrepreneurs. This persistence can be both negative and positive and is consistent with the findings of the sunk cost for entrepreneurs. On the negative side, persistence brings about the extra-cost effect which is a barrier to innovation. On the positive side, it shows determination, commitment, and diligence on the part of entrepreneurs after deciding to achieve a goal.

The results of the fifth question show that integration and segregation of information fail to create bias in decisions among entrepreneurs. However, we observed bias in nonentrepreneurial decision-making. In general, information integration is a means to increase sales through promotion. Therefore, the finding that entrepreneurs' decision-making was not influenced is indicative of their awareness of the deception inherent in the question.

Finally, in the sixth question, we examined a problem related to opportunity cost through the framing effect. In contrast with nonentrepreneurs, entrepreneurs were able to identify the opportunity cost and make a more optimal decision.

Study 2

Sample

Study 2 consisted of an Internet-based survey sent to 581 adults (214 students, 185 inexperienced entrepreneurs, and 182 experienced entrepreneurs). The students were all undergraduates mainly studying science at the University of Tehran. They ranged in age from 18 to 28 years, with a mean of 20.6 years (SD = 3.7). Both groups of entrepreneurs came from different industries, and their firms were located in the science and technology parks in Iran (8 of 16 parks in the country). They ranged from 22 to 67 years of age, with a mean of 31.4 years (SD = 8.9).

We used the "risky-choice framing" section of Huang and Wang's (2010) questionnaire for this study. The respondents were randomly assigned to three different task domains (ie life/death, investment, and time task domains). We chose these three domains for our experiment tool to address a common human issue (ie life/death), a business matter that entrepreneurs generally deal with often (ie money/investment), and an educational dilemma that students commonly confront (ie time for university projects). To compare the three cohorts, we used the sum of responses for all three task domains rather than testing differences within each domain. Then, respondents were randomly assigned to either a positive frame or a negative frame (Huang and Wang 2010). All three groups of respondents were randomly assigned to the three task domains (see Table 2).

Table 2. Sample sizes for each subgroup after random assignments.

Task domains	Experienced entrepreneurs	Inexperienced entrepreneurs	Student
Life-death			
Positive	35	30	37
Negative	28	33	31
Investment			
Positive	36	33	30
Negative	26	36	42
Time			
Positive	20	28	41
Negative	37	25	33

Inexperienced entrepreneurs are those in the start-up period with no past business experience, while experienced entrepreneurs are those who had an established business for at least five years with a minimum of 8–15 employees (Hornaday and Aboud 1971; Hornaday and Bunker 1970). The risky-choice framing was included in each domain, and respondents were randomly assigned to either a positive or a negative frame. The survey consisted of double-choice questions.

Analysis

We used descriptive statistics (mean, frequency, and cross-tabulation) and a nonparametric test (Kruskal–Wallis *H*) to analyze the differences between the groups. As noted, the study was a 3 (groups: experienced [coded 1] vs. inexperienced [coded 2] vs. student [coded 3]) × 2 (options: positive vs. negative) × 2 (domain: risky vs. certain) design. Therefore, this study has a main research question as follows: Does entrepreneurial experience influence individuals' decisions in view of the risk framing effect of life/death, investment, and time task domains? We applied the results of Tversky and Kahneman's (1981) Asian disease problem for comparison.

Results

The abbreviations PR and PC in the study refer to risky and certain options in the positive form, and NR and NC mean risky and certain option in the negative form, respectively. Tversky and Kahneman's (1981) original Asian disease framing problem showed a difference between PR and NR of approximately 50% (78%–28%) and a difference between PC and NC of 50% (72%–22%). Greater proximity to these numbers means higher framing effects. Table 3provides the primary results.

Table 3. The response rate of all groups in the risk framing effect of life/death, investment, and time task domains.

	Experienced entrepreneurs (%)	Inexperienced entrepreneurs (%)	Students (%)
Positive			
Risky(PR)	51	47	30
Certain(PC)	49	53	70
Negative			
Risky(NR)	60	80	76
Certain(PC)	40	20	24

The results show that students are more prone to framing effects in all three domains (life/death, money, and time) than inexperienced and experienced entrepreneurs (see Table 2). In addition, the results of the Kruskal–Wallis test show a significant difference between negative and positive framing among entrepreneurs and students (for all groups, positive $\chi^2(2, N = 290) = 9.78, p < 0.01$; for all groups, negative $\chi^2(2, N = 291) = 9.92, p < 0.01$).

Although the framing effect is noticeable among the three groups, experienced entrepreneurs have fewer tendencies toward framing in all domains. The inexperienced entrepreneurs have more tendencies toward negative than positive framing. As Table 2 shows, the mean difference between PR–NR and PC–NC in the student group is 46%; this was 33% and 9% for inexperienced and experienced entrepreneurs, respectively. These results reveal that inexperienced entrepreneurs have less tendency toward the framing effect than students while experienced entrepreneurs have the least tendency toward the framing effect among the groups.

Table 4. The percentage of responses within each group.

	NR (%)	NC (%)	Sum (%)	PR (%)	PC (%)	Sum (%)
Experienced entrepreneurs	49	51	100	40	60	100
Inexperienced entrepreneurs	53	47	100	20	80	100
Students	70	30	100	24	76	100
Tversky and Kahneman's (1981) Asian disease	72	28	100	22	78	100

Note: Each portion consists of average response rates of all three task domains of life-death, time, and investment within each group.

In the negative framing condition, we find no significant difference between inexperienced entrepreneurs and students ($\chi^2(1, N = 200) = 0.328, p > 0.05$) but a significant difference between experienced entrepreneurs and inexperienced entrepreneurs and students ($\chi^2(1, N = 185) = 8.24, p < 0.01$). In the positive framing condition, we find no significant difference between inexperienced entrepreneurs and students ($\chi^2(1, N = 182) = 0.547, p > 0.05$) but a significant difference between students and both groups of entrepreneurs (χ^2 $(1, N = 199) = 9.88, p < 0.01$). This suggests that entrepreneurs are more risk-takers than the other groups. Therefore, in the

positive manipulation, entrepreneurs have less tendency to choose certain options than students; however, PC is still greater than PR (see Table 4). In general, inexperienced entrepreneurs are more risk-taking in the negative framing than experienced entrepreneurs. In addition, experienced entrepreneurs' risk-taking behavior is more moderate. Thus, the framing effect is greater among inexperienced than experienced entrepreneurs.

Several studies have introduced risk-taking as a characteristic of entrepreneurs (Brockhaus 1980; McClelland 1961). Entrepreneurs are more open to risk-taking at the preliminary stages of setting up a business. This issue may have amplified risk-taking by inexperienced entrepreneurs in NR. Other studies have found that entrepreneurs have a moderate propensity for risk (Timmons 1978; Welsh and White 1981), and this may partly explain the results obtained for experienced entrepreneurs in NR.

Discussion

Studies in framing show that analytical individuals have fewer tendencies toward framing effects than holistic individuals (Leboeuf and Shafir 2003; McElroy and Seta 2003). Entrepreneurs are more likely to identify the differences between unsatisfied needs, which helps them recognize opportunities. Over time, experienced entrepreneurs learn how to improve their analytical reasoning to imagine other states simultaneously when confronted with an unsatisfied need in the market (eg identifying an unsatisfied need is a negative state that other individuals often neglect or do not pay attention to). In the current study, this is evidenced by the group of experienced entrepreneurs that behaved more consistency in following their course of action.

According to the Australian School, entrepreneurship is rooted in asymmetry in entrepreneurial knowledge and information that others have not yet understood and exploited. This knowledge in turn leads to the discovery of available beneficial differences and gaps and opportunity discovery. Considering the discovered opportunity, entrepreneurs invest in this knowledge to achieve a profit (Foss and Klein 2012; Knight 1921).

Consciousness and analyses make spontaneous learning more effective for successful entrepreneurs. The level of consciousness is different from one person to another. Even if two individuals have the same level of experience, they may not achieve the same result because the nature of learning is different for each (Kirzner 1979). Kirzner (1979) cites learning from prior mistakes and considers experience a teacher for entrepreneurs. He views learning as a non-conscious process that leads to the discovery of entrepreneurial opportunities. By contrast, continued entrepreneurial activity leads to increased knowledge about situations, thus reducing the level of uncertainty over time and enhancing market processes (Cheah 1990). Therefore, with increased experience over time, entrepreneurs are likely to perceive less uncertainty or be less affected by the framing of issues in the business world. As such, it is not surprising that experienced entrepreneurs have a different perception of framing issues than inexperienced entrepreneurs.

One reason entrepreneurs are more risk-taking than others is their optimism (Anderson and Galinsky 2006). Their higher self-confidence enables them to perceive a high probability of success (Lichtenstein and Fischhoff 1977). Entrepreneurs’ propensity toward PR is largely due to

their risk-taking (Emami 2017). Entrepreneurs with experience have a stronger sense of power and control over situations, which allows them to be less concerned about possible negative outcomes. As a result, they can choose risky options with less fear (50% in PR).

Research in the framing literature has shown that loss aversion diminishes risk aversion (Soman 2004; Thaler 1999). Thus, experienced entrepreneurs who show fewer tendencies toward NR generally perceive less loss or are less concerned about loss. In addition, entrepreneurship research shows that experience shapes a specific cognitive framework to tackle negative situations (Bhaduri and Worch 2008). Entrepreneurs often have more inclination toward cognitive and heuristic biases due to the ambiguity and uncertainty encompassing entrepreneurial activities. The significant difference between the framing effect in the negative area and less impressibility of experienced entrepreneurs stems from usage of the heuristic approach and bias between experience and inexperienced entrepreneurs. As learning is a necessary component in the entrepreneurial process, the best way to tackle losses in a business is learned by experienced entrepreneurs over time, and this leads to reduced loss aversion. The difference between NR and PR among experienced entrepreneurs is slight because they are equipped with idiosyncratic knowledge to take a calculated risk and have less conflict in making decisions.

In the current competitive business environment, identifying framing problems is imperative. Depending on their specific conditions, external and internal environments of a firm can unconsciously form a specific frame of information or opportunities that may contain framing effects. An example of this was raised in our investment (money) scenario. With knowledge of these framings, sometimes investors, patent trolls, or patent intermediaries (Agrawal, Bhattacharya, and Hasija 2016) can try to force inexperienced entrepreneurs (or inventors) to act in favor of their interests, such as selling their patents or the technical knowledge of their products below market value. There is a substantial stream of research and examples on this issue in the intellectual property literature. While this threat exists, in the framing literature, "reframing" (Soman 2004; Thaler 1999) refers to the process by which individuals reformulate a decision scenario in a way that they are most comfortable with. In addition, training and giving advice to people in the reframing process could help reduce framing effects in judgments and decision-making (Druckman 2001). Improving their awareness of framing and cognitive bias problems could serve as a useful competitive advantage and a resource for entrepreneurial endeavors. Investigating the nature and quality of this idiosyncratic knowledge would be a promising topic for future research.

General discussion

This study attempted to scrutinize the behavior of entrepreneurs through two distinct studies. We examined entrepreneurs' responses to decision anomalies and the impact on entrepreneurial judgment and decision-making. As entrepreneurs are more likely to face risks and uncertainty than other professionals, they need to be more careful about decision anomalies, including mental accounting and framing effects. That is, people's attention can be framed such that it can even challenge their targeted and planned efforts. For example, people may ignore the slight differences between options, even though these options have a significant role; integrate the outcomes to increase the attractiveness of the options; give more weight to losses than wins; look for simple reasons at the time of selection; and compare the outcomes of the problem with the

most available anchoring points. This could be a default or status quo situation. Study 1 showed that mental accounting bias has little impact on entrepreneurs' judgments. However, cognitive biases of sunk cost influenced their judgments.

Cognitive limitations do not allow people to consider all the criteria. As noted, while some of these intuitions and biases are desirable and save time for processing complex and demanding tasks, they could be deemed risks if they put the situation out of reach and limit people's control in the process. In Study 2, data on the risk framing effect comparing inexperienced and experienced entrepreneurs' decisions using an online survey revealed that experienced entrepreneurs' judgments were less influenced by the framing effect while inexperienced entrepreneurs were more biased toward loss aversion.

When making fundamental decisions such as choosing a technology, getting involved in strategic partnerships with others, or adopting a business model, entrepreneurs need to evaluate the conditions and information and trust their experiences and knowledge to avoid the effects of mental accounting and situation framing. For example, entrepreneurs need to determine if their decision is based on anchoring points or status quo biases or on opportunities and the demands of customers. Intuition becomes dangerous when entrepreneurs become certain of their mental values or rely on bias or over-confidence without considering the realities of an ecosystem. This might lead to opportunity loss and dissatisfaction.

Implications

For more than two decades the concept of mental accounting has been applied to many areas, including policy, economics, marketing, political sciences, and medicine. This research is a starting point for entrepreneurship research on decision anomalies. For example, future research could include specific topics related to entrepreneurship, such as opportunity recognition, teams, and innovation. Practical applications related to entrepreneurship education, such as mental accounting, could be included in a university entrepreneurship curriculum to improve students' decision-making capabilities. Entrepreneurs can gain a competitive advantage by providing effective mental frames for attracting customers and making sound investments. In addition, by improving their skills in issues related to mental accounting, inexperienced entrepreneurs could become more aware and effective.

Limitations and future research directions

Research has shown that context and culture affect mental models (Willard and Norenzayan 2013). We carried out our research in Iran. Therefore, conducting similar studies in other contexts could provide further insights into this topic. Different degrees of risk and uncertainty or technological and environmental changes could be tested. Another question is what implications decision anomalies and cognitive biases may have for managerial settings, depending on decisions (El Shamy and Hassanein 2015) or the nature of information at hand (Caputo 2014; Zollo, Pellegrini, and Ciappei 2017). We challenged entrepreneurs' judgments and decision-making using mental accounting and the framing effect in this study, but the origins of these behaviors could be addressed in future research. For example, research could examine the sunk cost effect to determine the reason for the differences in decision-making between

entrepreneurs and nonentrepreneurs. Moreover, research could investigate the difference between judgments by entrepreneurs and managers in terms of framing effects and mental accounting. Alternatively, what opportunities and threats are entrepreneurs likely to face when they are predisposed to certain types of cognitive biases or framing effects (eg goal framing vs. attribute framing; Kahneman, Knetsch, and Thaler 1991; Levin, Schneider, and Gaeth 1998)? This study provides first evidence of how entrepreneurs develop judgments and make decisions when faced with decision anomalies.

Disclosure statement

No potential conflict of interest was reported by the authors.

Amir Emami, PhD, is an Assistant Professor of Entrepreneurship at the Faculty of Management, Kharazmi University (Iran). His research interests lie in the intersection of cognition, value creation and entrepreneurship.

Dianne H.B. Welsh, PhD, is the Hayes Distinguished Professor of Entrepreneurship and Founding Director of the award-winning Cross-Disciplinary Entrepreneurship Program at The University of North Carolina-Greensboro. She is a globally known scholar in international entrepreneurship, family business, franchising, and nonfinancial employee reward systems with over 200 publications.

Veland Ramadani, PhD, is an Associate Professor at South-East European University, the Republic of Macedonia. His research interests include entrepreneurship, small business management, family businesses and venture capital investments.

Ali Davari, PhD, is an Assistant professor at the Faculty of Entrepreneurship, University of Tehran. His research interests are entrepreneurship policy, national competitiveness, institutions, country-level analysis, and corporate entrepreneurship.

References

Abatecola, G., A. Caputo, and M. Cristofaro. 2018. “Reviewing Cognitive Distortions in Managerial Decision-making: Toward an Integrative Co-Evolutionary Framework.” Journal of Management Development 37 (5):409–424.

Agrawal, A.,. B. Bhattacharya, and S. Hasija. 2016. “Cost-Reducing Innovation and the Role of Patent Intermediaries in Increasing Market Efficiency.” Production and Operations Management 25 (2):173–191.

Anderson, C., and A. D. Galinsky. 2006. “Power, optimism, and Risk-Taking.” European Journal of Social Psychology 36 (4):511–536.

Barbosa, S. D., and A. Fayolle. 2007. “Where Is the Risk? Availability, Anchoring, and Framing Effects on Entrepreneurial Risk Taking.” Frontiers of Entrepreneurship Research 27 (6):1–15.

Baron, J. 2006. “President's Column: Normative, Descriptive, and Prescriptive. Newsletter of the Society for Judgment and Decision-making.” Society for Judgment and Decision-making 25 (4):5–7.

Baron, J. 2008. Thinking and Deciding. Cambridge, UK: University Press.

Begley, T. M., and D. P. Boyd. 1987. “Psychological Characteristics Associated with Performance in Entrepreneurial Firms and Smaller Businesses.” Journal of Business Venturing 2 (1):79–93.

Bhaduri, S., and H. Worch. 2008. “Past Experience, Cognitive Frames, and Entrepreneurship: Some Econometric Evidence from the Indian Pharmaceutical Industry.” Papers on Economics and Evolution 8 (4):1–41.

Brockhaus, R. 1980. “The Effect of Job Dissatisfaction on the Decision to Start a Business.” Journal of Small Business Management 181:37–43.

Burmeister, K., and C. Schade. 2007. “Are Entrepreneurs’ Decisions More Biased? An Experimental Investigation of the Susceptibility to Status Quo Bias.” Journal of Business Venturing 22 (3):340–362.

Busenitz, L. W., and J. B. Barney. 1997. “Biases and Heuristics in Strategic Decision-Making: Differences between Entrepreneurs and Managers in Large Organizations.” Journal of Business Venturing 12 (1):9–30.

Caputo, A. 2014. “Relevant Information, Personality Traits and Anchoring Effect.” International Journal of Management and Decision-making 13 (1):62–76.

Casson, M. 1982. The Entrepreneur: An Economic Theory. Oxford, UK: Martin Robertson.

Cheah, H. B. 1990. “Schumpeterian and Austrian Entrepreneurship: Utility within Duality.” Journal of Business Venturing 5 (6):341–347.

Cheema, A., and D. Soman. 2003. Malleable Mental Accounting. St. Louis, MO: Washington University, Olin School.

Dimov, D. 2018. “Uncertainty Under Entrepreneurship.” In Philosophical Reflexivity in Entrepreneurship: Understanding, Challenging, Advancing and Synthesizing Worldviews in Entrepreneurship Research, edited by A. Fayolle, S. Ramoglou, M. Karatas-Özkan, and S. Nicolopoulou. Abingdon: Routledge.

Druckman, J. N. 2001. “Using Credible Advice to Overcome Framing Effects.” Journal of Law, Economics, and Organization 17:62–82.

El Shamy, N., and K. Hassanein. 2015. “The Influence of Cognitive Biases and Decision-Making Styles on Older Adult E-Commerce Decisions.” In Information Systems and

Neuroscience, edited by F. D. Davis, R. Riedl, J. V. Brocke, P. M. Leger, and A. B. Randolph. Cham, Switzerland: Springer.

Emami, A. 2017. “Gender Risk Preference in Entrepreneurial Opportunity: Evidence from Iran.” International Journal of Entrepreneurship and Small Business 30 (2):147–169.

Emami, A., F. Saghafi, B. Zarei, M. Ebrahimzadeh, and A. Davari. 2011. “The Managerial Application of Framing Effects and Mental Accounting in Network Participation.” Advances in Production Engineering and Management 6:57–69.

Forbes, D. P. 2005. “Are Some Entrepreneurs More Overconfident than Others?” Journal of Business Venturing 20 (5):623–640.

Foss, N. J., and P. G. Klein. 2012. Organizing Entrepreneurial Judgment: A New Approach to the Firm. New York, NY: Cambridge University Press.

Frederick, S., N. Novemsky, J. Wang, R. Dhar, and S. Nowlis. 2009. “Opportunity Cost Neglect.” Journal of Consumer Research 36 (4):553–561.

Gourville, J., and D. Soman. 2002. “Pricing and the Psychology of Consumption.” Harvard Business Review 80 (9):90–96.

Hornaday, J. A., and J. Aboud. 1971. “Characteristics of Successful Entrepreneurs.” Personnel Psychology 24 (2):141–153.

Hornaday, J. A., and C. S. Bunker. 1970. “The Nature of the Entrepreneur.” Personnel Psychology 23 (1):47–54.

Huang, Y., and L. Wang. 2010. “Sex Differences in Framing Effects across Task Domain.” Personality and Individual Differences 48 (5):649–653.

Kahneman, D. 2003. “Maps of Bounded Rationality: Psychology for Behavioral Economics.” American Economic Review 93 (5):1449–1475.

Kahneman, D., and A. Tversky. 1984. “Choices, Values and Frames.” American Psychologist 39 (4):341–350.

Kahneman, D., J. L. Knetsch, and R. H. Thaler. 1991. “Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias.” Journal of Economic Perspectives 5 (1):193–206.

Kirzner, I. 1979. Perception of Opportunity and Profit. Chicago, IL: University of Chicago Press.

Knight, F. 1921. Risk, Uncertainty and Profit. Boston, MA: Houghton Mifflin.

Kreiser, P. M., and J. Davis. 2010. “Entrepreneurial Orientation and Firm Performance: The Unique Impact of Innovativeness, Proactiveness, and Risk-Taking.” Journal of Small Business and Entrepreneurship 23 (1):56–71.

Leboeuf, R., and E. Shafir. 2003. “Deep Thoughts and Shallow Frames: On the Susceptibility to Framing Effects.” Journal of Behavioral Decision Making 16 (1):77–92.

Levin, I. P., S. L. Schneider, and G. J. Gaeth. 1998. “All Frames Not Created Equal: A Typology and Critical Analysis of Framing Effects.” Organization Behavior and Human Decision Processes 76 (2):149–188.

Lichtenstein, S., and B. Fischhoff. 1977. “Do Those Who Know More Also Know More about How Much They Know?” Organization Behavior and Human Decision Processes 20 (2):159–183.

McClelland, D. 1961. The Achieving Society. Princeton, NJ: Van Nostrand.

McElroy, T., and J. Seta. 2003. “Framing Effects: An Analytic–Holistic Perspective.” Journal of Experimental Social Psychology 39 (6):610–617.

Nicolaou, N.,. S. Shane, L. Cherkas, and T. D. Spector. 2009. “Opportunity Recognition and the Tendency to Be an Entrepreneur: A Bivariate Genetics Perspective.” Organizational Behavior and Human Decision Processes 110 (2):108–117.

Palmer, M. 1971. “The Application of Psychological Testing to Entrepreneurial Potential.” California Management Review 13 (3):32–38.

Ramadani, V., L. P. Dana, N. Sadiku-Dushi, V. Ratten, and D. Welsh. 2017. “Decision-Making Challenges of Women Entrepreneurship in the Family Business Succession Process.” Journal of Enterprising Culture 25 (04):411–439.

Schumpeter, J. A. 1934. The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle. Harvard Economic Studies. Vol. 46. Cambridge, MA: Harvard College.

Soman, D. 2004. “Framing, Loss Aversion and Mental Accounting.” In Handbook of Judgment and Decision-Making Research, edited by N. Harvey and D. Koehler, 379–398. London: Blackwell.

Thaler, R. H. 1999. “Mental Accounting Matters.” Journal of Behavioral Decision-making 12(1):183–206.

Timmons, J. A. 1978. “Characteristics and Role of Demands of Entrepreneurship.” American Journal of Small Business 3 (1):5–17.

Tversky, A., and D. Kahneman. 1981. “The Framing of Decisions and the Psychology of Choice.” Science (New York, N.Y.) 211 (4481):453–458.

Tversky, A., and D. Kahneman. 1986. “Judgment under Uncertainty: Heuristics and Biases.” In Judgment and Decision Making: An Interdisciplinary Reader, edited by H. R. Ares and R. Hammond, 38–55. New York, NY: Cambridge University Press.

Welsh, J. A., and J. F. White. 1981. “Converging on Characteristics of Entrepreneurs.” In Frontiers of Entrepreneurship Research, edited by K.H. Vesper, 504–515. Wellesley, MA: Babson Center for Entrepreneurial Studies.

Willard, A. K., and A. Norenzayan. 2013. “Cognitive Biases Explain Religious Belief, Paranormal Belief, and Belief in Life’s Purpose.” Cognition 129 (2):379–391.

Zollo, L., M. Pellegrini, and C. Ciappei. 2017. “What Sparks Ethical Decision-making? The Interplay between Moral Intuition and Moral Reasoning: Lessons from the Scholastic Doctrine.” Journal of Business Ethics 145 (4):681–700.

Appendix

Question 1 (task framing)

“Imagine you intend to expand your business physically (eg you are manufacturing front suspension parts for heavy vehicles, and you are planning to manufacture tires or the like). If for this expansion you must choose between two business options (A and B), each with advantages and disadvantages, which one would you select?”

Option A

1. Proximity to target markets (suitable distance to target market)
2. Low-cost human resources
3. Fast and high return on investment
4. Numerous opportunities to expand this business in the future
5. Familiarity with this business
6. Lack of specialized workforce in the target area
7. High tax rate in this business
8. Bad weather conditions (eg extreme storms, cold weather)
9. Long distance between your place of residence and your business location
10. High environmental variability, such as laws and regulations

Option B

1. Relatively acceptable distance with target markets
2. Workforce with average wages
3. Average return on investment
4. Modest number of opportunities to expand the business in the future

5. Relative familiarity with the business
6. A modest rate of specialized workforce in the region
7. Modest tax rate compared with other businesses
8. Moderate weather conditions
9. A relatively far distance between your place of residence and your business location
10. Rules and regulations are relatively stable.

Question 2 (endowment effect)

"Imagine having bought a rug for personal use many years ago for 100 USD. Now you get an offer for that rug for 2,100 USD from the same vendor. Meanwhile, you have never paid more than 730 USD for a rug. How much are you willing to sell it for?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

Question 3 (sunk cost effect)

Part 1

"Suppose you have spent 4000 USD on a research project aimed to promote the brand image of your products in the minds of your customers. When the project reaches 90% of its completion, you find that the project will not be efficient with the changes that have taken place in the current market situation and there is the possibility of implementing a superior strategy to promote your brand, with less implementation costs. How much are you willing to continue to pay for the completion of the remaining 10% of the project?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

Part 2

"You are offering a joint investment to a close friend to buy Company A's shares. Your friend welcomes your suggestion. The shares are non-registered and transferable, but the purchase of shares has a time-limit and they are not returnable to Company A after being bought. You buy some shares for 1000 USD. Your friend notifies you after a week that he does not have cash now and asks you as his partner to buy shares for him and promises to return the amount in the near future. When buying the shares, you find out that for the same number of shares you must pay 1100 USD. Relying on your friendship and after negotiating with him, you pay the amount. After 10 days, your partner informs you that he has suffered heavy losses in his business and is not able to pay his debts and notifies you that he is unable to maintain this partnership. You desperately need your money, so you must surely sell your share to get that money. However, no one is willing to pay more than 830 USD. Which set of shares are you willing to sell?"

Your share☐
Friend's share☐
No difference☐

Question 4 (extra-cost effect)

In the questionnaire *P*

"Imagine you decide to see a show at a theater (regardless of your interest in the show) for a 3 USD ticket. As soon as you enter the theater, you find that you have lost your 3 dollars. Although you have enough money, how much are you willing to pay another three USD for a ticket?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

In the questionnaire *N*

"Imagine that you have decided to see a show at a theater (regardless of your interest in a particular show) for a 3 USD ticket. You buy the ticket beforehand. On the day of the show, you find that you have lost the ticket. Your place in the theater is not checked, so the ticket is not refundable. Although you have enough money, how much are you still willing to pay another three USD?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

Question 5 (integration and segregation of information)

State 1

"Imagine you want to buy a jacket and a calculator. You go to a shopping mall. The jacket is 25 USD and the calculator is 3 USD. The salesperson tells you that in the other branch, which is about a 20-minute drive away, you could buy the same calculator for 2 USD. How much are you willing to go to the other branch?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

State 2

"Imagine you want to buy a jacket and a calculator. You go to a shopping mall. The jacket is 3 USD and the calculator is 25 USD. The salesperson tells you that in the other branch, which is about a 20-minute drive away, you could buy the same calculator for 24 USD. How much are you willing to go to the other branch?"

Absolutely reluctant	1	2	3	4	5	6	7	Totally willing

Question 6 (opportunity cost)

"You can offer two products (A or B) to the market. Each would equally cost 2000 USD to produce and offer to the market. It is estimated that Product A will sell at 2300 USD, while Product B will sell at 2400 USD. A part of Product B is made from raw materials that you have in your warehouse, which if not used in production could be sold for 200 USD. If, due to

material constraints, you can produce only one of the products, which one would you choose to produce?”